

Listing of Claims

1-23. (Cancelled)

24. (Original) A method for reducing odor, said method comprising:

mixing the salt of a transition metal with silica particles to form a transition metal / silica particle mixture;

selectively adjusting the pH of said mixture to 7 or greater so that modified silica particles are formed that contain said silica particles and said transition metal; and

contacting said modified silica particles with an odorous compound, said transition metal providing one or more active sites for capturing said odorous compound.

25. (Original) A method as defined in claim 24, wherein said silica particles have an average size of less than about 100 nanometers.

26. (Original) A method as defined in claim 24, wherein said transition metal is selected from the group consisting of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, silver, gold, and combinations thereof.

27. (Original) A method as defined in claim 24, wherein said salt comprises a copper ion (Cu^{+2}), silver ion (Ag^{+}), gold ion (Au^{+} and Au^{+3}), iron (II) ion (Fe^{+2}), iron (III) ion (Fe^{+3}), or combinations thereof.

28. (Original) A method as defined in claim 24, wherein said pH is selectively adjusted through a urea pyrolysis reaction.

29. (Original) A method as defined in claim 24, wherein said pH is selectively adjusted by adding an alkali metal carbonate, an alkali metal bicarbonate, or combinations thereof, to said mixture.

30. (Original) A method as defined in claim 24, wherein said pH is selectively adjusted by adding a basic compound to said mixture.

31. (Original) A method as defined in claim 24, wherein said odorous compound is selected from the group consisting of mercaptans, ammonia, amines, sulfides, ketones, carboxylic acids, aldehydes, terpenoids, hexanol, heptanal, pyridine, and combinations thereof.

32. (Original) A method for reducing odor, said method comprising:
coupling a transition metal to a surface of silica particles with an organofunctional silane so that modified silica particles are formed that contain said silica particles and said transition metal; and
contacting said modified silica particles with an odorous compound, said transition metal providing one or more active sites for capturing said odorous compound.

33. (Original) A method as defined in claim 32, wherein said silica particles have an average size of less than about 100 nanometers.

34. (Original) A method as defined in claim 32, wherein said transition metal is selected from the group consisting of scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, silver, gold, and combinations thereof.

35. (Original) A method as defined in claim 32, wherein said organofunctional silane comprises an alkoxysilane.

36. (Original) A method as defined in claim 32, wherein said organofunctional silane comprises an aminofunctional alkoxysilane.

37. (Original) A method as defined in claim 32, wherein said organofunctional silane forms a covalent bond with silanol groups present on said surface of said silica particles.

38. (Original) A method as defined in claim 37, wherein said transition metal forms a coordinate bond with said organofunctional silane.

39. (Original) A method as defined in claim 32, wherein said odorous compound is selected from the group consisting of mercaptans, ammonia, amines, sulfides, ketones, carboxylic acids, aldehydes, terpenoids, hexanol, heptanal, pyridine, and combinations thereof.

40-53. (Cancelled)

54. (Previously Presented) A method as defined in claim 24, wherein said silica particles have an average size of less than about 500 microns.

55. (Previously Presented) A method as defined in claim 24, wherein said silica particles have an average size of from about 4 to about 20 nanometers.

56. (Previously Presented) A method as defined in claim 24, wherein said silica particles have a surface area of from about 50 to about 1000 square meters per gram.

57. (Previously Presented) A method as defined in claim 24, wherein said silica particles have a pore volume of less than about 0.5 milliliters per gram.

58. (Previously Presented) A method as defined in claim 24, wherein said pH is selectively adjusted to a pH of from about 9 to about 10.

59. (Previously Presented) A method as defined in claim 30, wherein said basic compound is selected from the group consisting of sodium hydroxide, potassium hydroxide, ammonium hydroxide, and combinations thereof.

60. (Previously Presented) A method as defined in claim 24, further comprising applying said modified silica particles to a substrate.

61. (Previously Presented) A method as defined in claim 60, wherein said substrate comprises a nonwoven, woven, or paper web.

62. (Previously Presented) A method as defined in claim 24, wherein the mole ratio of the transition metal to the silica particles is at least about 10:1.

63. (Previously Presented) A method as defined in claim 24, wherein the mole ratio of the transition metal to the silica particles is at least about 50:1.

64. (Previously Presented) A method as defined in claim 24, wherein said silica particles are spherical.

65. (Previously Presented) A method as defined in claim 32, wherein said silica particles have an average size of less than about 500 microns.

66. (Previously Presented) A method as defined in claim 32, wherein said silica particles have an average size of from about 4 to about 20 nanometers.

67. (Previously Presented) A method as defined in claim 32, wherein said silica particles have a surface area of from about 50 to about 1000 square meters per gram.

68. (Previously Presented) A method as defined in claim 32, wherein said silica particles have a pore volume of less than about 0.5 milliliters per gram.

69. (Previously Presented) A method as defined in claim 32, further comprising applying said modified silica particles to a substrate.

70. (Previously Presented) A method as defined in claim 69, wherein said substrate comprises a nonwoven, woven, or paper web.

71. (Previously Presented) A method as defined in claim 32, wherein said silica particles are spherical.

72. (Previously Presented) A method as defined in claim 32, wherein the mole ratio of the transition metal to the silica particles is at least about 10:1.

73. (Previously Presented) A method as defined in claim 32, wherein the mole ratio of the transition metal to the silica particles is at least about 50:1.